

Marine Water Pollution: Dissolved Oxygen Levels in Coastal Waters

Background

Dissolved oxygen is a fundamental requirement for the maintenance of balanced populations of fish, shellfish, and other aquatic organisms. The nature and extent of the organism's response to low oxygen concentrations depends on several factors including the concentration of oxygen in the water, the duration of the organism's exposure to reduced oxygen, and the age and physiological conditions of the organism.

Because dissolved oxygen is so important to marine life, New Jersey has established surface water criteria for oxygen levels in marine waters. The surface water criterion is five milligrams per liter for ocean waters and four milligrams per liter for estuarine waters. Dissolved oxygen concentrations below two milligrams per liter are considered lethal to aquatic life, while concentrations above two but below the four or five milligrams per liter designation may support aquatic life, but warrant further study. However, prolonged periods of exposure to below optimum conditions may stress some aquatic life.

Trend

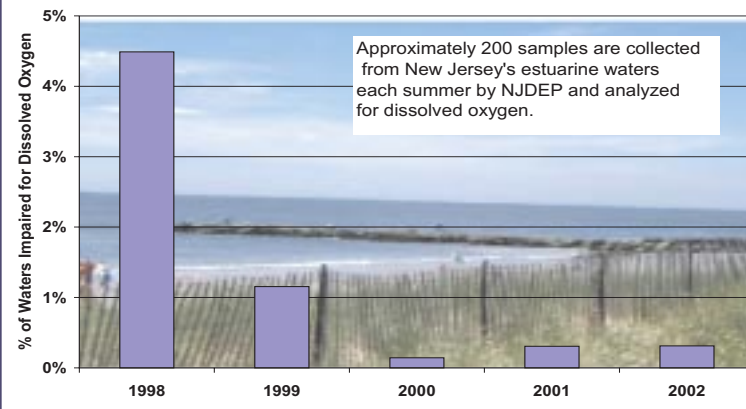
Assessment of dissolved oxygen in ocean waters began in 2002 and revealed that 70 percent of the state's ocean waters (bottom waters only) did not meet the state's surface water criterion. DEP, EPA and Rutgers University are planning studies to better understand ocean dissolved oxygen levels and the factors influencing them.

The chart on the right shows the trend with regard to estuarine waters assessed for summer dissolved oxygen conditions over a five-year period. While it appears that impairment dropped after 1998, five years of data are not enough to be certain that improvement is permanent. There is some variation from year to year caused by a variety of factors, such as weather. As monitoring continues, a clearer picture will emerge of any long-term changes and their causes.

Outlook and Implications

While the trend for New Jersey's estuarine (bay) waters in recent years is encouraging, the factors responsible for long-term changes in dissolved oxygen levels are poorly understood. In recent years, data on the health of the benthic community in New Jersey's estuarine waters has been collected to complement ongoing dissolved oxygen

NJ Estuarine Waters Impaired for Dissolved Oxygen during Summer Months



measurements and provide a more complete picture of the health of the state's estuarine waters.

A long-term assessment of New Jersey's ocean waters is not available at this time (only year 2002 data has been assessed). As with estuarine waters, the factors responsible for long-term dissolved oxygen trends are not well understood. Further study (as described above) of these factors and their impact on ocean ecosystem health is clearly warranted.

It is hoped that new stormwater rules recently adopted by New Jersey will improve the quality of New Jersey's ocean waters by reducing the potential for growth of certain algal species that respond to excess nutrients typically carried by stormwater.

More Information

Additional information can be obtained by contacting DEP's Bureau of Marine Water Monitoring at (609) 748-2000 or by visiting www.nj.gov/dep/bmw.

References

- ¹ Cosper, E.M. 1995. Assessment of Historical Phytoplankton Characteristics and Bloom Phenomena in the New York Harbor Estuarine and New York Bight Ecosystems. Preliminary Report. E.M. Cosper, Coastal and Environmental Studies, Inc., Bohemia, NY. May 4, 1995.